British Columbia

CLIMATE CHANGE

Business Plan

2000/01 – 2000/03

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BRITISH COLUMBIA

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climate change impacts and action in British Columbia,

see the Ministry of Environment, Lands and Parks

climate change website at:

http://www.elp.gov.bc.ca/epd/epdpa/ar/climate/

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Honourable Joan Sawicki
Minister of Environment, Lands and Parks

Honourable Dan Miller
Minister of Energy and Mines

MESSAGE FROM THE MINISTERS

October 2000

Since the Kyoto Protocol was negotiated in 1997, jurisdictions around the world have been developing strategies to address the environmental and economic challenge of climate change. While there is still uncertainty regarding the exact pace of change and magnitude of impacts, it is clear that taking action now to reduce greenhouse gas emissions is the right thing to do for our environment, our economy, and future generations.

There is a broad consensus of expert opinion that the continued warming of our climate could have potentially serious impacts on our forestry and fisheries sectors, drinking and agricultural water supplies, local air quality, and biodiversity. That's why we will be joining our provincial and federal counterparts at the Joint Ministers Meeting this month to develop Canada's position in preparation for the next round of international negotiations in November 2000.

We are proud to present British Columbia's three-year business plan on climate change. It is a plan that includes specific actions to reduce our greenhouse gas emissions, improve local air quality, and manage energy costs. It focuses on "win–win" actions that will support a growing economy without imposing extra costs on business or consumers.

Taking action to address climate change will create new opportunities for British Columbia to grow our environmental technology sector, help businesses save energy, and provide relief from traffic congestion on our roads through investment in public transit, cycling networks, and other alternatives to single-occupancy vehicles.

The steps we take today will determine what kind of planet our grandchildren will inherit. We will continue to work constructively with the federal government and other provinces to implement a national climate change strategy. We will update this business plan over time as we move to meet our national and international commitments to reducing greenhouse gas emissions in British Columbia.

Joan Sawicki Dan Miller

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PREFACE

This business plan was developed with the help of the BC Greenhouse Gas Forum, which provided suggestions and feedback on the planning framework, as well as on climate change actions.

The plan's preparation was coordinated by the Ministry of Environment, Lands and Parks, Ministry of Energy and Mines, Ministry of Employment and Investment, Green Economy Secretariat, and Government Policy and Communications Office.

Other contributing agencies were: BC Buildings Corporation, BC Hydro, BC Transportation Financing Authority, Crown Corporations Secretariat, Information, Science and Technology Agency, Inter-governmental Relations Secretariat, Greater Vancouver Regional District, Ministry of Agriculture, Food and Fisheries, Ministry of Community Development, Cooperatives and Volunteers, Ministry of Finance and Corporate Relations, Ministry of Forests, Ministry of Health, Ministry of Municipal Affairs, Ministry of Transportation and Highways, and Purchasing Commission.

Graphic design and writing support were provided by DeMo Communications, Ellen F Battle Consulting, GL Bridges and Associates, and Global Change Strategies International Inc.

Abbreviations and Acronyms

AFV	Alternative fuel vehicle
AMG	Analysis and Modelling Group
BCBC	BC Buildings Corporation
BCH	BC Hydro
BCTFA	BC Transportation Financing Authority
BEST	Better Environmentally Sound Transportation
CAFE	Corporate Average Fuel Economy
CDM	Clean Development Mechanism
CEM	Community energy management
CEP	Community energy planning
CIPEC	Canadian Industry Program for Energy Conservation
CO_2	Carbon dioxide
CO_2e	CO_2 equivalent
CoP	Conference of the Parties to the UNFCCC
CoP6	Sixth Conference of the Parties
EAC	Energy Aware Committee
FCM	Federation of Canadian Municipalities
GERT	Greenhouse Gas Emission Reduction Trading pilot
GES	Green Economy Secretariat
GHG	Greenhouse gas
GVRD	Greater Vancouver Regional District
GWP	Global warming potential
HOV	High occupancy vehicle
IPCC	Intergovernmental Panel on Climate Change
ISTA	Information, Science and Technology Agency
ITS	Intelligent transportation systems
JI	Joint implementation
LEV	Low-emission vehicle
MAFF	Ministry of Agriculture, Food and Fisheries
MCDCV	Ministry of Community Development, Cooperatives and Volunteers
MEI	Ministry of Employment and Investment
MELP	Ministry of Environment, Lands and Parks
MEM	Ministry of Energy and Mines
MFCR	Ministry of Finance and Corporate Relations
MoF	Ministry of Forests
MMA	Ministry of Municipal Affairs
MoTH	Ministry of Transportation and Highways
ODS	Ozone Depleting Substances
OGC	Oil and Gas Commission
PCP	Partners for Climate Protection
PEO	Public education and outreach
R&D	Research and development
SOV	Single-occupancy vehicle
SUV	Sport utility vehicle
TDM	Transportation demand management
UNFCCC	United Nations Framework Convention on Climate Change
VCR Inc.	Voluntary Challenge and Registry Incorporated

WHAT ARE GREENHOUSE GASES (GHGs)?

Naturally-occurring gases, such as water vapour, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), and other ozone depleting substances (ODS), trap some of the sun's heat and prevent it from escaping into space. This natural "greenhouse effect" keeps the earth's surface at a comfortable average 15°C, some 33°C warmer than it would be otherwise.

Greenhouse gases contribute differently to global warming depending on their atmospheric lifetime and global warming potential, or capacity to absorb and reradiate heat energy over a fixed period of time.

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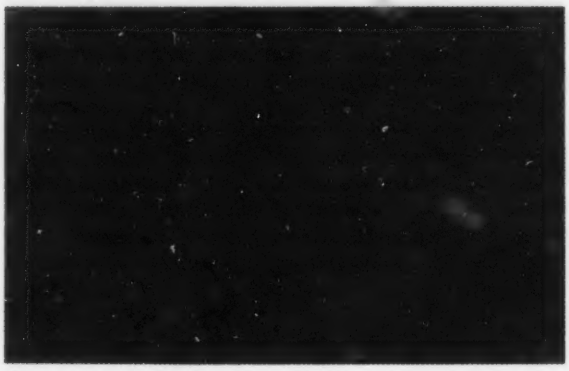


EXECUTIVE SUMMARY

British Columbia has produced its first *Climate Change Business Plan* as part of Canada's national implementation strategy on climate change. This business plan lays out objectives and actions to reduce provincial emissions of greenhouse gases (GHGs) and to prepare for future decisions.

BC's emissions are growing faster than the national average, in areas where GHG reduction is a particular challenge: transportation, oil and gas production, and electricity supply. Nonetheless, by acting now we can reduce emissions growth and at the same time improve local air quality, manage energy costs, and develop new technology business in the province.

This inaugural business plan manages the risk and uncertainty of climate change by adopting low-cost actions that deliver additional environmental, health, and economic benefits. As such, it fits within Phase One of the national implementation strategy covering the period until an international treaty (the Kyoto Protocol or its successor) is ratified.

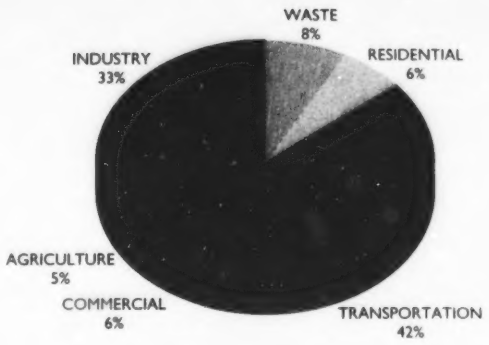
The plan was developed by a cross-government team, drawing on work from the national climate change process and stakeholder consultations through the BC Greenhouse Gas Forum. It supports the goals of the national strategy, as well as those of the Green Economy and other provincial initiatives.

BC's planning framework focuses on five priority areas for action – transportation, energy and industry, communities and buildings, forests and agriculture, and supporting actions. Each priority area has its own objectives and specific actions for emission reduction.

This first plan presents more than 40 actions to reduce GHG emissions immediately or to prepare for future emission reductions (see Table 1). These are all low-cost, high-benefit actions that will not burden business or consumers.

BC's plan recognizes that new infrastructure, new technologies, and changes in human behaviour are all required to curb emissions growth over the long term. While infrastructure and technology are pivotal to achieving substantial GHG reductions, they will take time to implement. Consequently, behavioural change is important to begin reducing emissions right away.

Individual British Columbians contribute more than one-quarter of provincial emissions, through activities such as personal transportation, home energy use, and household waste going to landfill. As it evolves, BC's climate change response will rely heavily on private citizens, organizations, businesses, and communities to do their respective parts in GHG reduction.



BC GHG EMISSIONS BY SECTOR (2000 est.)

Most of BC's emissions are from transportation and industry, including energy supply. *Source: AMG (1999)*

As the first in a series of three-year plans, this initial effort is designed to make significant progress in 2000/01 and to achieve measurable results by 2002/03. The BC Climate Change Business Plan includes major new initiatives in transportation and technology, and is supported by more than $13 million in new funding for energy efficiency and renewable energy, community-based programs, education and outreach, policy development, and other initiatives.

The plan will be monitored and updated annually to report on progress and incorporate further climate change action. Progress will be measured using a set of performance indicators. Future actions will be developed in collaboration with the federal government, BC communities, industry, and other partners.

Whether or not the Kyoto Protocol or another agreement is ratified, local and global action is needed now to stabilize the growing atmospheric concentrations of greenhouse gases. The province welcomes your ideas on how to improve this business plan in the coming years. We all have a large stake in the potential impacts of climate change and in cost-effective ways to avoid these impacts and keep our economy strong.

Table 1

BC CLIMATE CHANGE BUSINESS PLAN ACTIONS

ACTION	LEAD
TRANSPORTATION	
SkyTrain expansion	BCTFA
HOV and transit lanes	BCTFA/MoTH
Financial and legislative support for cycling	BCTFA/MoTH
Consultations on light-duty vehicle emissions options	MFCR
Natural gas hybrid ferry	MoTH
Proposed passenger rail service expansion	MoTH
Selected ITS measures	BCTFA/MoTH
Federal action on transit, technology, and vehicle fuel efficiency	MoTH
Transportation awareness program	MELP
Long-term tax policy for alternative fuels	MFCR
MoTH lease of alternative fuel vehicles	MoTH
Fuel cell vehicles	MEI/ISTA
Fuel ethanol production	MELP
National biomass ethanol development centre	MELP
ENERGY AND INDUSTRY	
Industry energy efficiency audits and incentives	MEI
GHG guidelines for planning and approval processes	MELP
Resource Smart investments	BCH
BC Hydro offset program	BCH
Oil and Gas Environmental Fund	OGC
Energy carbon management strategy	MEM
Request for Green Power	BCH
Energy Futures Program	BCH
Water rental incentives for small hydro power	MEI
Renewable energy initiative	MEI
Beehive burner tax shift pilot	MELP
COMMUNITIES & BUILDINGS	
Greening communities	MCDCV/MMA
Landfill gas management	MELP
Urban and rural local government infrastructure	MMA
Regional growth strategies and TDM	MMA
Green Buildings BC Retrofit Program	BCBC
Green Buildings BC New Buildings Program	BCBC
Appliance and equipment energy standards	MEI
Office of Green Buildings Technologies	BCBC
Green Buildings Partnership	BCBC
FORESTS & AGRICULTURE	
Forest carbon accounting framework	MoF
Forest sink estimation	MoF
Forest soil carbon estimation	MoF
Agricultural soil carbon sequestration	MAFF
Afforestation pilots	MoF
Legislation for carbon credits	MoF
Agricultural workshops	MAFF
SUPPORTING ACTIONS	
Greening government	GES
Market mechanisms	MELP/MEI
Adaptation in BC's fisheries sector	MAFF
Science, impacts, and adaptation	MELP
Improved GHG inventories	MELP
Public education and outreach	MELP
Green Economy Development Fund	MEI
Green Venture Capital Fund	MEI
Fuel cell technology	MEI

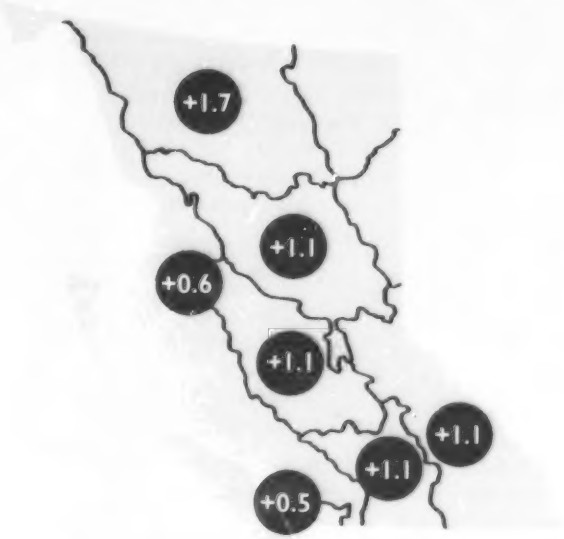
Climate change poses a serious threat to our collective environment, economy, and well-being – a threat that requires both global cooperation and local action. The drive for international action continues to build, as countries move towards agreement on an international treaty (the Kyoto Protocol) to limit greenhouse gas emissions.[1] Here in Canada, the federal, provincial, and territorial governments have developed a national strategy and business plan to meet our global responsibilities.

This document, the first *British Columbia Climate Change Business Plan*, sets out the actions that the province will take over the next three years to reduce emissions and address the risks of climate change, as part of Canada's national climate change strategy. The plan builds on the many actions already taken over the last decade in transportation, energy efficiency, technology development, and other areas.[2] It will be updated every year to report on progress and identify further action to be taken.

Recent climate change developments

We know more about the potential effects of climate change, although details remain uncertain. The Intergovernmental Panel on Climate Change (IPCC) has affirmed that the balance of evidence suggests a discernible human influence on the global climate.[3] Among its possible effects in BC, climate change could lead to rising sea levels and flooding, more frequent severe weather events, further declines in fish stocks, and a transformation of forests due to increased fire, pests, and disease. At the same time, agriculture could expand in certain regions and new higher-value crops could be introduced.[4] Many impacts of climate change are already being seen, particularly in Canada's north. Some BC regions have warmed by 1.0°C or more over the past century, twice the global warming rate.[5] Glaciers have retreated, river levels have fluctuated, and coastal precipitation has increased by about 20 percent. Nevertheless, while scientists have learned much in recent years, there is still uncertainty about the nature, magnitude, and timing of climate change, and about its impacts on specific regions and economic sectors.

International negotiations are building momentum. In 1992, Canada signed the United Nations Framework Convention on Climate Change (UNFCCC), which seeks to stabilize atmospheric concentrations of greenhouse gases before they reach dangerous levels. Five years later, 154 countries adopted the Kyoto Protocol, agreeing to emission reduction targets for developed countries in the 2008–2012 period. Canada's target would require a six percent reduction in national GHG emissions below 1990 levels. Negotiations on the Protocol have continued since 1997 to complete key provisions of the treaty. At the next Conference of the Parties (CoP6) to the Convention in November 2000, attention will focus on the Kyoto Mechanisms, the treatment of carbon sinks, a compliance regime for the Protocol, and the role of developing countries. Future agreements requiring deeper cuts in emissions and participation by all countries will likely be needed to achieve the UNFCCC objective.



TEMPERATURE CHANGE IN BC 1895–1995

The province's "ecoregions" have warmed by up to 1.7°C over the past century. *Source: MELP (2000)*

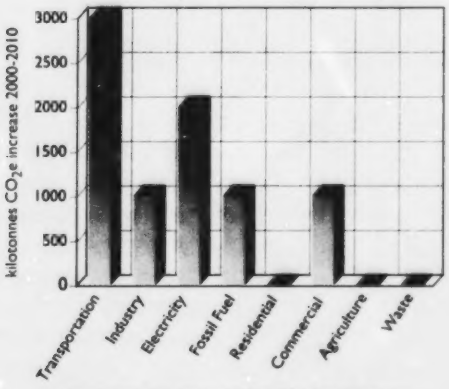
Canada has a comprehensive and inclusive climate change process. After the negotiation of the Kyoto Protocol, the federal, provincial, and territorial governments set up a national process to examine the costs and benefits of implementing it, as well as options for meeting Canada's target. During 1998 and 1999, 16 expert Issue Tables and working groups analyzed options for GHG reduction in areas ranging

[1] See Appendix 1 for a listing of key climate change events and timelines.
[2] See Appendix 2 for a summary of other initiatives already underway.
[3] IPCC (1995).
[4] These and other potential impacts of climate change are described in a report for the Canada Country Study: Climate Impacts and Adaptation series entitled *Responding to Global Climate Change in British Columbia and the Yukon* (Environment Canada and MELP 1997).
[5] Climate modelling results from the Canadian Institute for Climate Studies (1999). In its Second Assessment Report, the IPCC reported a 0.3 to 0.6°C rise in average global temperature over the past century (IPCC 1995).

from forests to transportation to public education and outreach.[6] More than 450 stakeholders and experts from across Canada, including many British Columbians, participated in the Issue Table process. The Tables' options were then reviewed and refined by each jurisdiction, with the help of stakeholder consultations, and the results were used to prepare the national, BC, and other jurisdictional business plans.

BC's challenges and opportunities

Our greenhouse gas emissions are among the fastest growing in Canada. From 1990 to 1997, total provincial emissions increased by 10.7 megatonnes of CO_2-equivalent (CO_2e), or 21 percent. Population growth accounted for much of the increase; however, emissions in some sectors, notably transportation, grew considerably faster than population. If current trends continue, BC's emissions are expected to rise by 38 percent between 1990 and 2010, the fourth largest percentage increase after Alberta, Saskatchewan, and Newfoundland (40 percent increase each).[7]



PROJECTED BC GHG GROWTH BY SOURCE

The fastest-growing emission sources are expected to be transportation, energy, other industry, and the commercial sector. *Source: AMG (1999)*

Emissions growth is happening in sectors where GHG reduction is especially difficult to achieve. Transportation is the single biggest source of GHG emissions in the province, followed by industry (including energy supply). Over the next ten years, major increases in emissions are anticipated in transportation, fossil fuel production, and electricity generation, all highly challenging areas for GHG reduction:

- The transportation sector is under pressure from demographic and economic forces, including population growth, competitive world markets, land use decisions, and lifestyle choices that favour bigger, less fuel-efficient passenger vehicles.
- Rapid growth in the natural gas sector results in higher emissions from processing, even though our exports help replace higher-emission energy sources elsewhere.
- BC's large hydroelectric system means that emissions grow rapidly as gas-fired generation is added, in contrast to thermal-based provinces that can switch to natural gas from higher-emitting coal and oil.

Climate change action offers other environmental, health, economic, and social benefits. Many actions to reduce GHG emissions also cut emissions of air pollutants, such as fine particulates and smog precursors, that affect local air quality and public health – particular concerns for the province's Lower Mainland and many smaller communities. Energy efficiency and renewable energy can help consumers manage energy costs in the face of rising fuel prices. In addition, climate change action provides opportunities for economic development, technology advancement, and job creation that may be missed unless BC acts promptly and decisively to address climate change.

BC must reduce its emissions and adapt to any unavoidable climate change impacts. Climate change is a global problem, since all emissions contribute to atmospheric GHG concentrations and the results are felt worldwide. Several provincial industries are especially vulnerable to climate change impacts, including forestry, fisheries, agriculture, hydroelectricity, and ecotourism. No matter what action is taken, some of these impacts may occur because of the cumulative effects of past emissions. The provincial government cannot address this serious environmental challenge on its own, but rather must work together with other jurisdictions and partners. All British Columbians – private citizens, businesses, institutions, and governments – must do their part to address the risk of climate change.

[6] The Issue Tables and working groups examined action in the following sectoral and cross-sectoral areas: Agriculture and Agri-food, Analysis and Modelling, Buildings, Credit for Early Action, Electricity, Enhanced Voluntary Action, Forest Sector, Industry, Kyoto Mechanisms, Municipalities, Public Education and Outreach, Science Impacts and Adaptation, Sinks (Carbon Sequestration), Technology, Tradeable Permits, and Transportation. Their Options Reports can be obtained from www.nccp.ca.

[7] Analysis and Modelling Group (1999), p. 51.

British Columbia has begun a series of three-year business plans linked to Canada's national climate change strategy. These plans will set out specific objectives and measures to reduce GHG emissions and to prepare for future decisions. A business planning approach will discipline our actions and ensure that the province proceeds in an orderly and cost-effective way to GHG reduction, suited to provincial needs and capabilities and subject to public scrutiny and accountability.

Implementation strategy

Canada has developed a national implementation strategy that provides a framework for a coordinated response to climate change. This strategy acknowledges that although climate change poses significant environmental, economic, and social risks, its impacts remain uncertain; moreover, an international agreement on emission reduction has yet to be finalized. Canada's approach emphasizes risk management, with three key elements:

- improve our understanding of climate change science and management;
- coordinate national and international responses; and
- implement a phased approach to action.

There are three initial phases to the national strategy. Phase One covers the period until an international agreement on climate change is ratified. It supports emission reduction actions that are the most cost-effective, deliver additional health, economic, and environmental benefits, and build momentum for progressive action. Taking early action to reduce emissions can also lower the overall costs of GHG reduction and help avoid the need for more drastic and expensive measures later.

Future phases of Canada's implementation strategy will be shaped by important decisions at the national and international levels. Once a decision has been made to ratify the Kyoto Protocol or its successor, Phase Two will focus on the development of necessary domestic policy instruments, such as a national emissions trading system.

Phase Three will encompass the commitment period of the international agreement and will likely involve the implementation of major domestic instruments and international mechanisms, including the Kyoto Mechanisms: emissions trading, joint implementation (JI), and the Clean Development Mechanism (CDM). Further phases are expected as international commitments and domestic requirements evolve.

Federal, provincial, and territorial governments have agreed to prepare business plans laying out the actions that will be taken to implement the national strategy. Consistent with the intent of Phase One, BC's first business plan is not designed to achieve a significant emission reduction target. Instead, the plan contains low-cost actions that improve air quality and public health, help consumers and business manage energy costs, and prepare the foundation for future phases.

Development of the plan

The BC Climate Change Business Plan was developed by a cross-government team, drawing on the national process work and on consultations with provincial stakeholders through the BC Greenhouse Gas Forum.[8] The Forum, an advisory group representing business, labour, environmental, and community interests, provided consensus recommendations on climate change policy in September 1998 and March 2000, as well as input on key elements of the business plan in September 2000.

This plan responds directly to many of the Forum's recommendations. It also incorporates the Green Economy and other ongoing provincial initiatives that seek cost-effective environmental improvements while providing jobs and other ancillary benefits.

Planning framework

The framework used to prepare the business plan is based on a set of five overarching national goals, five priority areas for action in BC, objectives within each priority area, and actions to meet the objectives. The structure is a modified version of the national business planning framework, which uses different priority areas or "themes".[9]

The plan supports five primary goals from the national strategy:

1. **Reduce greenhouse gas emissions.** Manage the risk of climate change by acting now, initiating least-cost actions with additional benefits, and proceeding in a logical, fiscally-responsible manner towards long-term emission reductions.

[8] Agencies on the government team are listed in the Preface at the beginning of this document.
[9] Appendix 3 provides a mapping of BC's actions to the national structure, for the purposes of roll-up into the national business plan.

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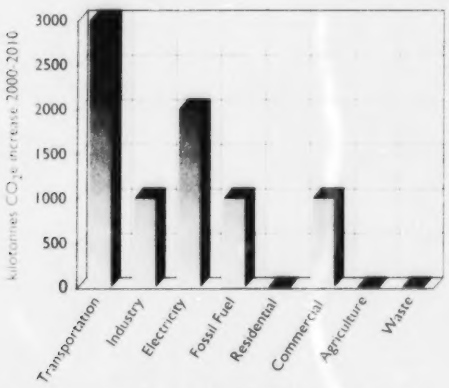

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THE BC CHALLENGE

1. **We need to cut emissions growth while remaining competitive in world markets.**
2. **We want to improve air quality, manage energy costs, and develop new business.**
3. **We will have to adapt to any climate change impacts that are unavoidable.**

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There are three initial phases to the national strategy. Phase One covers the period until an international agreement on climate change is ratified. It supports emission reduction actions that are the most cost-effective, deliver additional health, economic, and environmental benefits, and build momentum for progressive action. Taking early action to reduce emissions can also lower the overall costs of GHG reduction and help avoid the need for more drastic and expensive measures later.

Future phases of Canada's implementation strategy will be shaped by important decisions at the national and international levels. Once a decision has been made to ratify the Kyoto Protocol or its successor, Phase Two will focus on the development of necessary domestic policy instruments, such as a national emissions trading system.

Phase Three will encompass the commitment period of the international agreement and will likely involve the implementation of major domestic instruments and international mechanisms, including the Kyoto Mechanisms: emissions trading, joint implementation (JI), and the Clean Development Mechanism (CDM). Further phases are expected as international commitments and domestic requirements evolve.

Federal, provincial, and territorial governments have agreed to prepare business plans laying out the actions that will be taken to implement the national strategy. Consistent with the intent of Phase One, BC's first business plan is not designed to achieve a significant emission reduction target. Instead, the plan contains low-cost actions that improve air quality and public health, help consumers and business manage energy costs, and prepare the foundation for future phases.

BUSINESS PLAN FOCUS

1. **The plan consists of cost-effective measures that provide GHG reduction and other benefits.**
2. **Groundwork is laid for stronger future action.**
3. **Risk is managed pending ratification of an international agreement.**

Development of the plan

The BC Climate Change Business Plan was developed by a cross-government team, drawing on the national process work and on consultations with provincial stakeholders through the BC Greenhouse Gas Forum.[8] The Forum, an advisory group representing business, labour, environmental, and community interests, provided consensus recommendations on climate change policy in September 1998 and March 2000, as well as input on key elements of the business plan in September 2000.

This plan responds directly to many of the Forum's recommendations. It also incorporates the Green Economy and other ongoing provincial initiatives that seek cost-effective environmental improvements while providing jobs and other ancillary benefits.

Planning framework

The framework used to prepare the business plan is based on a set of five overarching national goals, five priority areas for action in BC, objectives within each priority area, and actions to meet the objectives. The structure is a modified version of the national business planning framework, which uses different priority areas or "themes".[9]

The plan supports five primary goals from the national strategy:

1. **Reduce greenhouse gas emissions.** Manage the risk of climate change by acting now, initiating least-cost actions with additional benefits, and proceeding in a logical, fiscally-responsible manner towards long-term emission reductions.

[8] Agencies on the government team are listed in the Preface at the beginning of this document.

[9] Appendix 3 provides a mapping of BC's actions to the national structure, for the purposes of roll-up into the national business plan.

2. **Understand the impacts of climate change and develop adaptation strategies and actions.** Learn about impacts in vulnerable areas, develop adaptation responses, and begin to minimize the negative impacts of climate change and take advantage of related opportunities.

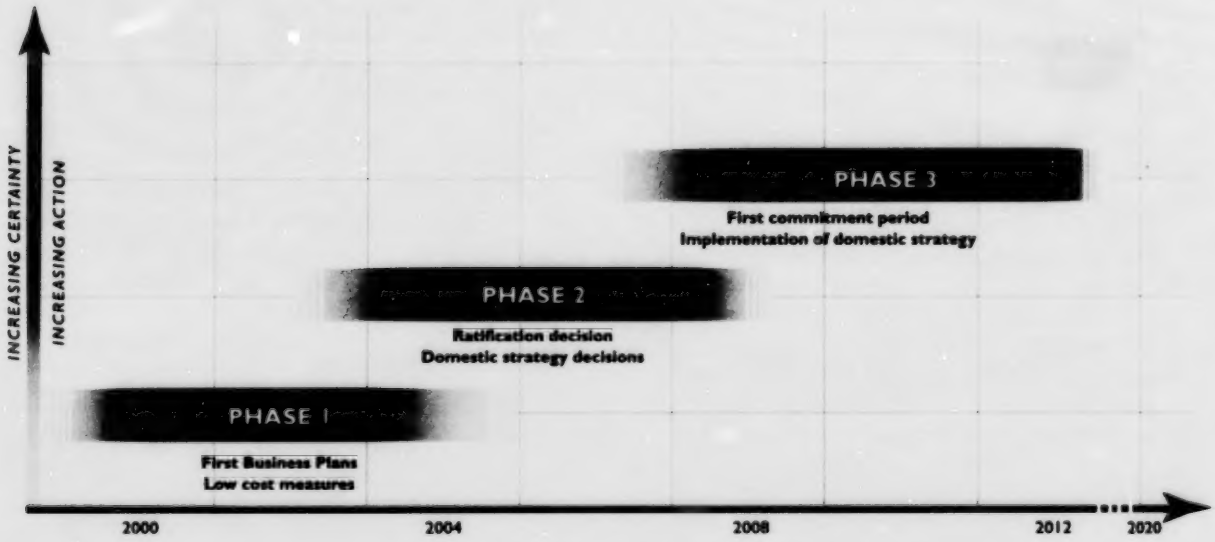
3. **Increase individual Canadians' and businesses' understanding about the importance of climate change action and encourage them to take action.** Implement a strategy for enhancing awareness and understanding and demonstrate leadership by reducing emissions in government operations.

4. **Position Canada to make decisions at the right time with the right information.** Invest in knowledge building, including modelling capacity and policy option assessment, and lay the foundation for future action.

5. **Increase opportunities through technology.** Promote the development of low-GHG technologies and provide opportunities for new businesses, high-quality jobs, technological advancement, and expanded domestic and international markets.

BC's business plan is structured around five priority areas for climate change action, four of which relate to key sectors of the economy – transportation, energy and industry, communities and buildings, forests and agriculture – while the fifth covers broader actions. This structure recognizes areas where action is most required.

Each priority area has objectives that will be pursued to achieve the goals outlined above and performance indicators for measuring progress towards the goals. Under each objective, actions are described for the three-year planning horizon. These refer to actions that are being implemented in the 2000/01 fiscal year or that have been approved for implementation during the next two fiscal years.[10]



A PHASED APPROACH TO CLIMATE CHANGE ACTION

The first *British Columbia Climate Change Business Plan* forms part of Phase One of the national implementation strategy.

[10] Other measures underway but predating the 2000/01 fiscal year are listed in Appendix 2.

TRANSPORTATION

Transportation is BC's largest and fastest-growing source of GHG emissions, accounting for about 42 percent of the current provincial total. Since 1990, transportation emissions have increased by 30 percent, more than our population growth (22%). Compared across provinces, transportation's share of total emissions is highest in BC.

Road vehicles, consisting of cars, passenger light trucks, and commercial trucks, make up about three-quarters of transportation emissions.[11] Within this group, the largest emissions growth is coming from light-duty trucks, due to the rising popularity of fuel-intensive sport utility vehicles (SUVs). Commercial trucking, off-road equipment, and domestic aviation are other fast-growing emission sources.

Transportation is a complex and challenging sector that involves a myriad of daily decisions made by many different players and influenced by all levels of government through activities such as regulation, provision of roads, and local land use planning. BC's economic competitiveness depends on being able to move goods and people as quickly and inexpensively as possible.

Emissions from this sector are driven by factors such as increases in population, economic growth, rising personal incomes, urban sprawl, and transportation choices. They have been growing, in part, because of longer travel distances, more vehicles on the road, and the trend towards heavier, less fuel-efficient passenger vehicles.

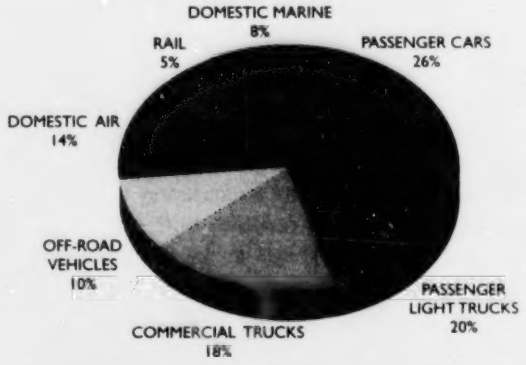
The national Transportation Issue Table has recommended a balanced strategy for GHG reduction that addresses infrastructure, technology, and behavioural change.[12] New infrastructure and technologies are the most promising options for substantial long-term emission reduction; both, however, will take time to implement. In the meantime, the best way to begin reducing emissions is to encourage people to adopt alternatives to single-occupancy vehicle (SOV) travel.

Action by individual British Columbians and all levels of government is critical if the growth in our transportation emissions is to be significantly slowed.

Objective 1:
Make transportation more efficient.

There are numerous ways to increase the efficiency of the transportation system, reduce GHG emissions, and improve BC's competitiveness. The range of possible actions includes enhanced public transit, trip reduction programs, promotion of alternative transportation modes, urban planning for more complete and compact communities, and road and parking fees.

Provincial and local governments are involved in various initiatives that provide GHG reduction and other environmental benefits. For example, TransLink, the transportation authority in Greater Vancouver, has prepared a Strategic Transportation Plan that calls for expanded transit systems, road improvements, and encouragement of alternative transportation choices.



BC TRANSPORTATION CO_2 EMISSIONS BY MODE (2000 est.)

Passenger vehicles are responsible for almost half of BC's estimated CO_2 emissions from transportation. Source: *AMG (1999)*

Actions:

- **SkyTrain expansion.** Over the next three years, the province will invest $780 million in the $1.2 billion Millennium Line to provide a new connection between New Westminster and Vancouver in the second half of 2002. Rapid Transit Project 2000 is also investigating other possible light rail connections, including a link between Port Moody and Coquitlam and another line west of Vancouver Community College.

- **High-occupancy vehicle (HOV) and transit lanes.** The Ministry of Transportation and Highways (MoTH) and the BC Transportation Financing Authority (BCTFA) are working with TransLink and municipal governments to

[11] Cars and light-duty trucks also account for two-thirds of common air pollutants in the Lower Fraser Valley airshed.
[12] Transportation Table (1999).

help the Lower Mainland transportation system keep pace with population growth, while improving local air quality. For this fiscal year, about $21 million in provincial funding will go to an HOV lane conversion on Highway 99/17, completion of the Port Mann Bridge expansion to include an eastbound HOV lane, and initiation of the Willingdon bus lane project. TransLink and the province are considering allowing access for single-occupancy low-emission vehicles (LEVs) to HOV lanes for a three-year trial period; this would include low-GHG-emitting vehicles, such as electric-gasoline hybrids.

- **Financial and legislative support for cycling.** The BCTFA continues its annual support for the development of cycling networks, with $1.7 million in funding being delivered to 27 communities in 2000/01. This year, the province has published a cycling policy that looks to provide bicycle facilities on new and upgraded highways, and is contributing $3.5 million ($5 million total commitment) toward development of the Trans Canada Trail. Legislation passed in June 2000 exempts motor-assisted bicycles from vehicle registration, licences, and insurance; supporting regulations are being prepared.

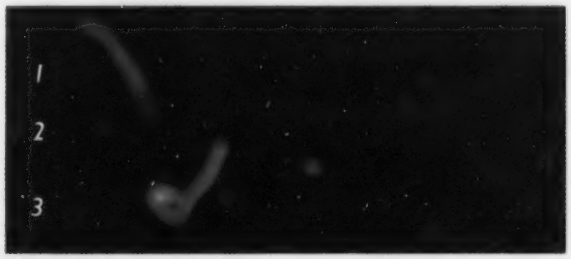
- **Consultations on light-duty vehicle emissions options.** Stakeholder consultations are underway to identify and evaluate options for reducing GHG emissions from passenger vehicles and light trucks. One of a number of identified options is a provincial feebate system based on vehicle fuel efficiency. The Ministry of Finance and Corporate Relations (MFCR) will release a public discussion paper this fall.

- **Natural gas hybrid ferry.** The 80-car, 250-passenger Osprey 2000 ferry, commissioned by MoTH in July 2000, currently operates on diesel fuel. Future plans for the Kootenay Lake ferry involve a dual natural gas and diesel fuel system conversion planned for later this year or early 2001/02. Once the conversion is complete, natural gas would become the primary fuel.

- **Proposed passenger rail service expansion.** The province is in discussions for the possible addition of a second daily Amtrak passenger train service between Vancouver and Seattle. Up to $20 million may be required to have the second train in place for the 2001 tourism season and to maintain US commitments to the service. BC has identified these Amtrak improvements as a priority for funding under the anticipated federal program for 50:50 cost-sharing of transportation infrastructure.

- **Selected intelligent transportation system (ITS) measures.** To improve traffic flows and reduce congestion in certain areas, BCTFA, MoTH, and TransLink are cooperating on selected ITS projects, including an advance traveller warning system and accident response process on the Trans-Canada Highway through the Lower Mainland. The province will complete an ITS strategic plan in 2001/02. Depending on the plan results and availability of funding, additional projects may be implemented over the next two years.

- **Federal action on transit, technology, and vehicle fuel efficiency.** BC will continue to press for more federal funding of public transit and the Ballard fuel cell, which are important to achieving significant emission reductions in the long term. In particular, the province will urge federal support for the wider introduction of fuel cell-powered buses. Currently, BC receives a much smaller share of national transportation funding than our population and contribution to federal gasoline taxes merit. The provincial government will also lobby for stronger vehicle efficiency requirements through a US/Canada review of CAFE (Corporate Average Fuel Economy) standards.



Objective 2:
Build awareness of transportation alternatives and fuel efficiency.

An important element of any GHG reduction strategy is to make people aware of the implications of their transportation choices and to encourage behavioural change. In the Lower Mainland, Victoria, Nanaimo, and Kamloops, local Go Green committees promote ridesharing, cycling, telecommuting, and other transportation alternatives.

Action:

- **Transportation awareness program.** The Ministry of Environment, Lands and Parks (MELP) will work with public and private sector partners on the development and delivery of transportation-related public education and outreach (PEO) initiatives across BC. Federal support will be sought for this effort over the next several months. A coordinated PEO strategy will ensure that British Columbians

receive a consistent message on transportation and climate change through awareness activities and communications on various transportation-related initiatives.

Objective 3:
Promote the development and use of fuel-efficient and alternative fuel technologies.

For several years now, BC has provided motor fuel tax exemptions for natural gas and 85 percent ethanol and methanol blended fuels, as well as a preferential tax rate for auto-propane, to encourage the use of alternative fuels. A similar tax exemption will be applied to ethanol used in lower-level gasoline blends once a commercial-scale ethanol plant is operating in the province. In 1999, a provincial sales tax refund of up to $500 was introduced for purchases of eligible new factory-built alternative fuel vehicles (AFV) and passenger buses.

Since 1980, the province has invested $21 million in the demonstration and commercialization of fuel cells, which offer a cleaner and more efficient energy source for vehicles. Ballard Power Systems and other BC companies have become world leaders in fuel cell technology and fuelling infrastructure, with significant spin-offs for the provincial economy.

Ethanol produced from high cellulose feedstocks (e.g., grasses, waste agricultural products, forest residue) was identified by the Transportation Issue Table as a promising developmental technology that could substantially reduce lifecycle GHG emissions compared to conventional fuels.[13] Ethanol from forest biomass represents a large economic opportunity for the province, given our abundant surpluses of wood residue. Currently, however, conversion of forest biomass to ethanol is not competitive with gasoline or with ethanol produced from commercially viable low cellulose feedstocks (e.g., grains), which can result in higher net GHG emissions.

Actions:

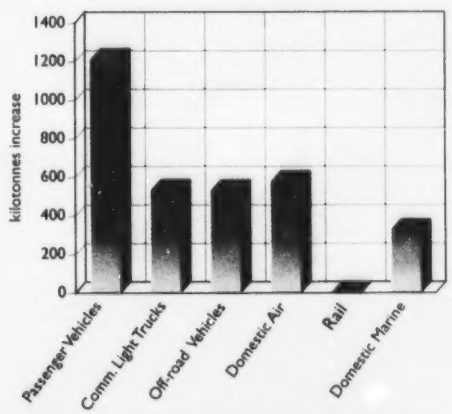
- **Long-term tax policy for alternative fuels.** This year, MFCR is implementing a preferential tax policy for all alternative fuels that will phase in tax rates based on market share and environmental benefits, with the maximum tax rate significantly below the gasoline rate. The policy is meant to provide greater certainty to suppliers and consumers of alternative fuels, and to encourage the development of these fuels and AFV purchases.

- **MoTH lease of alternative fuel vehicles.** In June 2000, MoTH leased 150 natural gas and propane vehicles to replenish its aging fleet. The new dual-powered vehicles generate some savings in GHG emissions by running on compressed natural gas or propane in addition to gasoline.

- **Fuel cell vehicles.** The Ministry of Employment and Investment (MEI) and the Information, Science and Technology Agency (ISTA) will continue to invest in and promote the fuel cell manufacturing industry, fuel cell technology and fuelling infrastructure. Fuel cell buses have been tested in the TransLink bus fleets.

- **Fuel ethanol production.** Under the Green Economy Initiative, the provincial government has provided $300,000 for an Ethanol Development Program that will support the development of commercially viable technologies for producing ethanol from softwood residue. The program is a collaboration among governments, forest companies, and the Canadian Petroleum Products Institute.

- **National biomass ethanol development centre.** MELP is proposing the establishment of a BC-based national centre to research, develop, and commercialize biomass-derived ethanol and related products. The centre would develop alliances and joint ventures with other research organizations, support technology development, conduct marketing studies, and work with partners to develop a national distribution system for ethanol from biomass.



BC TRANSPORTATION CO_2 EMISSIONS INCREASE 2000–2010

The largest source of GHG emissions growth is expected to be passenger vehicles, due to the trend toward heavier, less fuel-efficient vehicles (e.g., SUVs). *Source: AMG (1999)*

[13] Transportation Table (1999), p. 46.

help the Lower Mainland transportation system keep pace with population growth, while improving local air quality. For this fiscal year, about $21 million in provincial funding will go to an HOV lane conversion on Highway 99/17, completion of the Port Mann Bridge expansion to include an eastbound HOV lane, and initiation of the Willingdon bus lane project. TransLink and the province are considering allowing access for single-occupancy low-emission vehicles (LEVs) to HOV lanes for a three-year trial period; this would include low-GHG-emitting vehicles, such as electric-gasoline hybrids.

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TRANSPORTATION SNAPSHOT

1. **Transportation is BC's largest and fastest-growing source of GHG emissions.**
2. **New infrastructure, technologies, and behavioural change are all needed.**
3. **Individuals have a major role through personal transportation choices (e.g., reduced use of SUVs).**

Objective 2:
Build awareness of transportation alternatives and fuel efficiency.

An important element of any GHG reduction strategy is to make people aware of the implications of their transportation choices and to encourage behavioural change. In the Lower Mainland, Victoria, Nanaimo, and Kamloops, local Go Green committees promote ridesharing, cycling, telecommuting, and other transportation alternatives.

Action:

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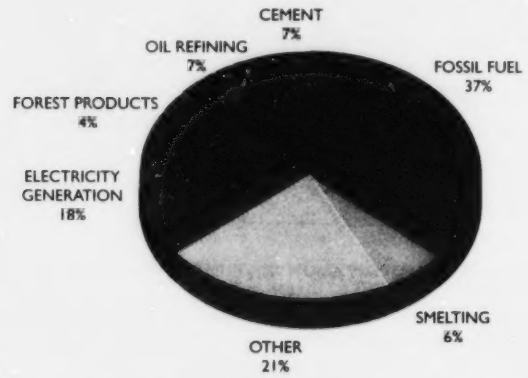
ENERGY AND INDUSTRY

Energy supply, resource industries, and manufacturing account for approximately one-third of BC's GHG emissions. Emissions grew at an annual rate of 2.8 percent between 1990 and 2000, compared to 3.1 percent for transportation. There is considerable diversity in the industrial sector, with varying intensities of energy use (energy consumed per unit of output) and opportunities for emission reduction. A major industry concern with respect to reducing emissions over the longer term is the ability to remain competitive in world markets and to attract investment.

The GHG intensity of electricity generation in BC is much lower than the Canadian average given our extensive hydro-electric system. Emissions are growing, however, because gas-fired generating stations are being built to meet new demand. Gas-fired projects are less expensive and easier to build than new large-scale hydroelectric facilities, which alienate land and threaten fish resources. Unless new non-emitting energy sources can be developed in a timely and cost-effective manner, GHG emissions from electricity generation will continue to grow, even with ongoing energy efficiency improvements.

The oil and gas sector produces significant amounts of carbon dioxide and methane during upstream extraction and processing, as well as in downstream oil refining and natural gas transmission. Since 1990, the province's natural gas production has grown by more than 80 percent, with about half of this production destined for export markets. Our natural gas displaces coal and oil in the US, reducing end-use emissions there, but the greenhouse gases produced upstream add to BC's emissions inventory.



BC INDUSTRY GHG EMISSIONS (2000 est.)

Fossil fuel and electricity production account for major shares of GHG emissions from BC industry. *Source: AMG (1999)*

Objective 1:
Cut GHG emissions in industry operations and energy supply and use.

Industry can reduce emissions by improving energy efficiency, switching to lower-emission fuels, and using alternative energy sources. Opportunities for cost-effective GHG reductions may be overlooked due to perceived risk, inadequate information, competing demands for capital, and other barriers.

A key consideration is the rate at which equipment is replaced. Since most of the existing capital stock will last through 2008 and beyond, increasing emission reductions before then will require accelerating stock turnover in the industrial sector.

BC companies have already made significant reductions on their own through the national Voluntary Challenge and Registry (VCR Inc.) program and industry-led initiatives, such as PowerSmart and the Canadian Industry Program for Energy Conservation (CIPEC). The forest sector has realized sizable gains by switching from oil to natural gas and biomass, although there is still a large amount of wood residue that could be used for electricity generation where financially viable.[14]

Opportunities to promote further voluntary emission reductions include enhancements to industry programs, support for energy efficiency, environmental benchmarking, and tax incentives to encourage industrial cogeneration (combined heat and power) and district heating.

Actions:

- **Industry energy efficiency audits and incentives.** MEI will deliver a program to facilitate industrial energy efficiency, in partnership with stakeholders and the federal government as appropriate. The program may include working with existing industry initiatives (e.g., CIPEC), developing a financing/insurance mechanism, and

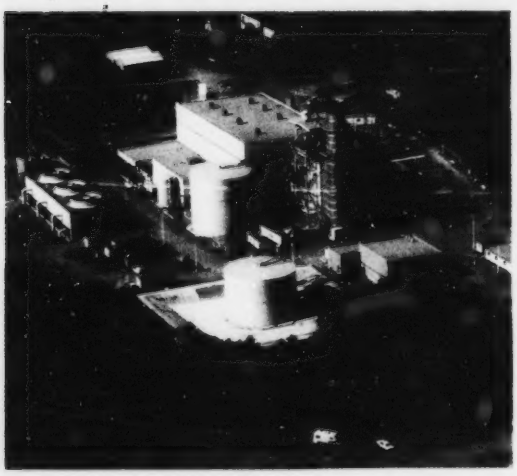
[14] Under international guidelines, wood residue is treated as a renewable energy source, so that the CO_2 emissions associated with burning it are not included in Canada's GHG inventory; however, methane, nitrous oxide, and other associated emissions are included. This creates a significant opportunity for BC to reduce emissions by switching from fossil fuels to wood residue in energy production. The province has an estimated two million tonnes of unused wood residue.

encouraging industry action through the provision of information and support for energy audits. An initial focus may be on the pulp and paper sector, where low-cost opportunities to reduce emissions have been identified.

- **GHG guidelines for planning and approval processes.** During the coming year, MELP will consult with industry and other stakeholders to develop appropriate GHG mitigation guidelines for provincial planning and assessment processes, including the BC Environmental Assessment Process and pollution prevention planning.

- **Resource Smart investments.** BC Hydro's Resource Smart program concentrates on deriving increased power output from existing facilities. This may be accomplished by replacing internal hydro turbine parts with modern, more efficient units, or by adding new turbines at existing facilities where surplus water is available. BC Hydro's January 2000 Electricity Plan Update identified GHG reduction benefits from advancing the installation of a fourth turbine at the Seven Mile Dam.[15]

- **BC Hydro offset program.** BC Hydro has committed to a three-year program of GHG emission offset purchases from other companies or organizations with reductions to sell. Under a new 14-year agreement, BC Hydro will buy 33 kilotonnes CO_2e of emission reductions from a landfill gas recovery and energy project in the Lower Mainland. The project captures methane from the Port Mann landfill and delivers it to a wallboard manufacturing plant in nearby Delta, where it is blended with natural gas and used as fuel in the plant's burners.



- **Oil and Gas Environmental Fund.** The province has an agreement with the petroleum industry to provide environmental research funding totaling $5 million over five years. Some $400,000 will be awarded to explore the development of best management practices and technologies for reducing natural gas flaring, sulphur dioxide, fugitive emissions, and GHG emissions. A Request for Proposals has been posted on the Oil and Gas Commission (OGC) website (www.ogc.gov.bc.ca) and the final decision on research projects will be made in Spring 2001.

- **Energy carbon management strategy.** MEM intends to work with its counterparts in Alberta and Saskatchewan to develop an interprovincial strategy on carbon management in the oil and gas sector by the end of next year. The strategy will provide a framework for research, deployment, and demonstration of carbon management technologies, such as acid gas injection, CO_2 injection for enhanced oil recovery and coalbed methane development, and plant emissions technology. The goal will be to determine where carbon dioxide capture and storage is feasible.

Objective 2:
Encourage the production and use of alternative energy and renewables.

There is significant potential for industry to access lower-emitting energy sources and reduce costs at the same time, for example, by using biomass energy or cogeneration.

The province's small hydroelectric resources are both substantial and underdeveloped, representing $450 million in potential new investment over the long term. Small hydro projects typically do not require large storage dams, and can be designed, sited, built, and operated with minimal impacts on fish, fish habitat, and cultural resources.

Actions:

- **Request for Green Power.** BC Hydro has committed to meet up to 10 percent of new demand with green energy, through a request for renewable and environmentally responsible power projects. This will result in the addition

[15] BC Hydro (2000), p. 33.

encouraging industry action through the provision of information and support for energy audits. An initial focus may be on the pulp and paper sector, where low-cost opportunities to reduce emissions have been identified.

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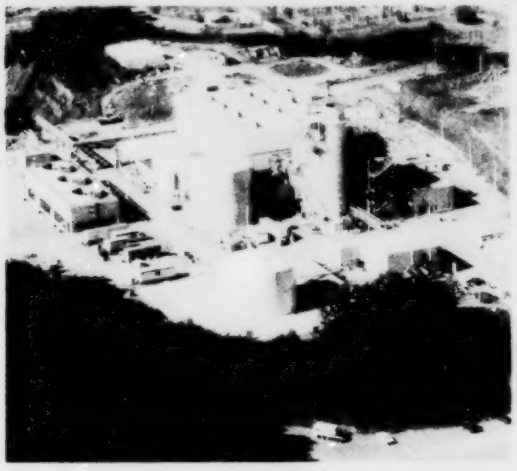

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ENERGY/INDUSTRY SNAPSHOT

1. **Emissions growth is focused in electricity supply, oil and gas production, and other manufacturing.**
2. **Existing voluntary efforts (e.g., in energy efficiency, alternative energy) should be enhanced.**
3. **Continued industry competitiveness is a major concern for GHG reduction measures.**

Objective 2:
Encourage the production and use of alternative energy and renewables.

There is significant potential for industry to access lower-emitting energy sources and reduce costs at the same time, for example, by using biomass energy or cogeneration.

The province's small hydroelectric resources are both substantial and underdeveloped, representing $450 million in potential new investment over the long term.[17] Small-hydro projects typically do not require large storage dams, and can be designed, sited, built, and operated with minimal impacts on fish, fish habitat, and cultural resources.

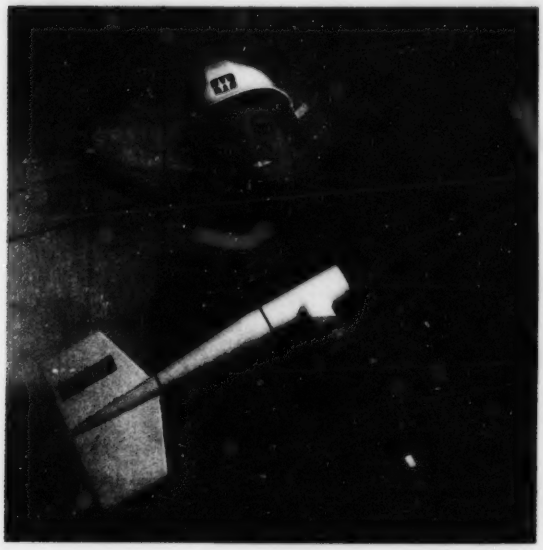
Actions:

- **Request for Green Power.** BC Hydro has committed to meet up to 10 percent of new demand with green energy through a request for renewable and environmentally responsible power projects. This will result in the additional

[17] BC Hydro (2000), p. 53.

of about 1,200 gigawatt-hours of energy by 2010, enough electricity to serve 100,000 homes for one year. Negotiations have been initiated with prospective developers and sellers of green power, with the first contracts anticipated in 2000/01.

- **Energy Futures Program.** This BC Hydro initiative identifies practical green energy options. Work to date has focused on wind energy, micro-hydro, wood residue utilization, community energy planning, and green labelling for commercial and industrial customers. Two wind monitors have been installed to evaluate wind viability and three more will be added across the province in the next year.



- **Water rental incentives for small hydro.** In August 2000, provincial water rentals were restructured to provide a lower rate for small hydroelectric generation. The rate restructuring makes small hydro more competitive with other energy sources, so that independent power producers will be motivated to develop projects in response to the BC Hydro request for green power.

- **Renewable energy initiative.** MEI will work with stakeholders and other governments to support the development of renewable energy in BC, including photovoltaics, solar thermal, micro-hydro, wind, biomass, district energy, and ground source heat pumps. Along with its partners, MEI will contribute financial support this year for renewable energy projects, conferences and workshops, and a best practices guide to assist local governments. Projects will continue over the next two years and results will be evaluated to determine whether a full-scale program is warranted.

- **Beehive burner tax shift pilot.** The province is implementing a tax shift pilot to encourage value-added uses for softwood residue, including the development of technologies to produce fuel ethanol, bio-oils, other chemical byproducts, and electricity. This project is revenue-neutral to government by using increased waste management fees to provide rebates of permit fees to operators who invest in alternatives leading to the phase-out of their burners.

Local governments can play a critical part in GHG reduction, not only through their control of community facilities, waste management, and other services, but also through their influence over land use practices, transportation systems, and energy and waste management in private buildings and infrastructure.

Communities have a major stake in climate change and strategies for adaptation. Extreme weather events, for example, could flood coastal areas and cause damage to private property, public infrastructure, and agricultural land. As a result, many BC municipalities have already acted to control emissions, recognizing the opportunity to improve air quality, cut waste, and achieve other local benefits at the same time.

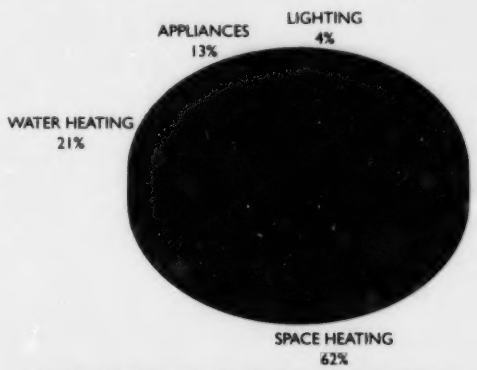
Some 20 BC municipalities belong to the Federation of Canadian Municipalities (FCM) Partners for Climate Protection Program, which works with communities to reduce their GHG emissions. In the Capital Region, there is an active Green Community program (City Green) that performs environmental home audits, including advice on energy efficiency and transportation choices. The GVRD has initiated the Air 2000 program, including demonstration of technology for significantly reducing GHG emissions from the production of concrete, retrofits of municipal indoor pools to solar thermal hot water heating, a public-private partnership to retrofit commercial and residential buildings, and a GHG action guide for facilitating municipal emission reductions.

Residential, commercial, and institutional buildings account for about 12 percent of provincial emissions. There are various simple and inexpensive actions that individuals and organizations can take to reduce emissions, while increasing business profits and improving health and comfort in homes. Examples include better lighting, automated controls on heating and ventilation equipment, and the purchase of energy-efficient appliances. Many homeowners and businesses do not take advantage of these opportunities because of low energy prices, insufficient capital, and other market barriers.

Objective 1:
Work with communities to encourage climate change awareness and action.

Community-based emissions can be managed through more compact urban design, efficient transportation networks, diversion of solid wastes, building energy retrofits and energy-efficient design, and tree planting for summer shade and carbon sequestration. Using community energy management (CEM) techniques, local governments can integrate energy considerations into many community planning issues, such as land use, transportation, and other infrastructure planning, and can take advantage of small-scale alternative energy options.

Local governments face obstacles, however, including insufficient knowledge and human resources, financial constraints, regulatory restrictions, and undeveloped markets for emission offsets. Communities need to build expertise in GHG reduction and pursue partnerships to fund CEM and other initiatives. FCM programs such as the $100-million Green Municipal Investment Fund and the $25-million Green Municipal Enabling Fund target local GHG projects.



CANADIAN RESIDENTIAL ENERGY CONSUMPTION

Space heating accounts for the majority of energy use in Canadian homes. Source: *The Sheltair Group Inc. et al (1999)*

Actions:

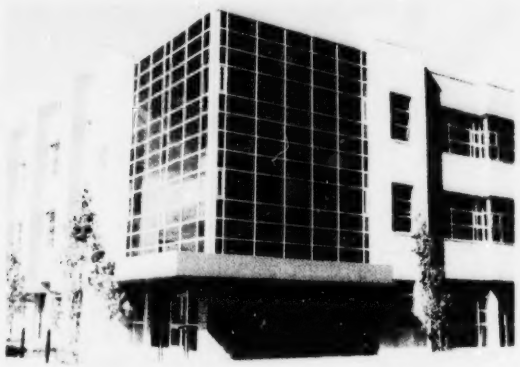
- **Greening communities.** The province will launch a program this year to fund "green community" demonstration projects. The program will also include the implementation of local government management frameworks based on sustainability principles, development of best practices guidelines for local governments, delivery of home energy audits through initiatives such as EnerGuide for Houses, and support to CEM capacity-building organizations (e.g., Energy Aware Committee and Smart Growth BC). The Growth Strategies provisions of the *Local*

Government Act will be evaluated with regard to strengthening local GHG reduction and a policy guideline will be prepared on urban fringe development. Work will continue through 2002/03, with a succession of community pilots, audit activity, and program evaluation.

- Landfill gas management. Roughly 75 percent of the methane gas generated in Canadian landfills is uncollected, one-third of which could be feasibly captured and flared or used for energy purposes.[1] MELP will update its landfill requirements next year, in particular the provisions related to landfill gas. The ministry will also provide technical assistance to local governments for the development of project proposals that can attract buyers of emission offsets.

- **Urban and rural local government infrastructure.** The provincial component of the Federal-Provincial Infrastructure Program will provide $268 million over five years, the majority of which is expected to fund green infrastructure projects that are cost-shared equally among the federal, provincial, and local governments. Some funding may be available for energy conservation and transportation, including conversion to lower-emitting fuels for public transit.

- **Regional growth strategies and transportation demand management (TDM).** With provincial support, local and regional governments in the fast-growing areas of the Lower Mainland, Okanagan Valley, and the east coast of Vancouver Island are developing regional growth strategies. These strategies shape land use and transportation networks, with the objective of reducing vehicle use and shortening travel distances. The Lower Mainland and Okanagan Valley are also developing TDM strategies, which encourage more efficient use of transportation resources without adding to SOV capacity. Both approaches offer a variety of environmental and economic benefits.



[1] Municipalities Table (1999), p. 54.

COMMUNITY/BUILDINGS SNAPSHOT

1. **Communities have extensive control and influence over GHG emissions.**
2. **Creating local expertise in community energy management is key.**
3. **Energy-efficient buildings, equipment, and technologies must be promoted.**

Objective 2:
Improve building energy efficiency.

It is generally easier and more cost-effective to incorporate energy efficiency and alternative energy features when homes and buildings are designed and built, rather than renovating later. However, around 80 percent of the structures that will exist in ten years have already been built, so that most of the scope for GHG reduction lies in energy retrofits and new energy-efficient appliances and equipment.

Energy audits and appliance rebates from utilities, the Energuide and Energy Star equipment labelling programs, and the R2000 home construction standard are all examples of effective progress on building energy efficiency that further this objective.

Actions:

- **Green Buildings BC.** This initiative was introduced in December 1999 to reduce the environmental impact of provincial facilities and, in the process, to foster the growth of BC's environmental industry. Under the initiative, innovative green building design and healthier facilities are being promoted. Green Buildings BC targets both new and existing provincial buildings through two related programs:
  - **Retrofit Program.** BC Buildings Corporation (BCBC) is encouraging the retrofit of provincially-funded schools, universities, colleges, and health care institutions to improve energy and water efficiency and reduce GHG emissions and waste generation. BCBC is providing a variety of services including guidance with procurement, qualification of contractors, and competitive financing. The program began this year, with retrofit pilots underway in one school district and two colleges.
  - **New Buildings Program.** This program, launched by MEI and delivered by BCBC, is piloting a sustainable approach to the design and construction of selected provincially-funded buildings. The intent is to gather information and experience to enable the development of guidelines and standards for new provincially-funded buildings. In 2000/01, aggressive

Government Act will be evaluated with regard to strengthening local GHG reduction and a policy guideline will be prepared on urban fringe development. Work will continue through 2002/03, with a succession of community pilots, audit activity, and program evaluation.

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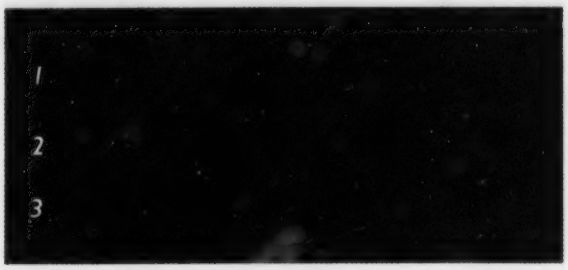
[16] Municipalities Table (1999), p. 34.



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energy performance targets (50% of the Model National Energy Code) are being tested in four pilot projects throughout BC, and all new provincial facilities will be built to meet or exceed the Model National Energy Code.

- **Appliance and equipment energy standards.** BC was one of the first Canadian jurisdictions to implement energy efficiency standards for new appliances and equipment, with regulations in place since 1990. Current standards for a range of energy-using products will be comprehensively reviewed in 2000/01 and then updated and supplemented, as required, during the next two years.

Objective 3:
Promote low-emission building technologies and practices.

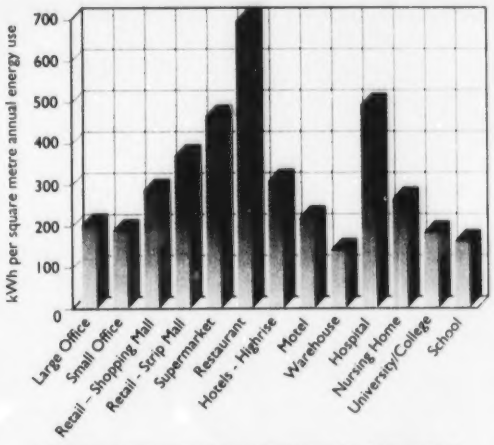
New technologies and alternative energy options are critical to containing emissions growth over the long term. Many advanced but proven technologies have yet to make significant inroads into the buildings market – for example, home automation, advanced lighting systems, ground source heat pumps, and solar hot water heating. Governments can help demonstrate and commercialize these technologies, in addition to supporting research on less proven energy sources.

For more than a decade, BC has provided a provincial sales tax exemption for certain wind, solar, and micro-hydro equipment, as well as for specific energy conservation products. Canada's Renewable Energy Deployment Initiative offers consumers incentives for the purchase of solar or biomass heating and cooling systems, and for marketing assistance to systems suppliers.

Actions:

- **Office of Green Buildings Technologies.** BCBC will create an office this fiscal year to implement green building performance standards for all new BCBC buildings and major renovations. Over the next two years, the office will develop a resource centre for green building information, produce best practices guides, adapt a rating system for new and existing buildings, and begin demonstration projects.

- **Green Buildings Partnership.** Also in 2000/01, the new BCBC office will establish a partnership to encourage a "green buildings ethic" in the public and private building sectors, and to identify and champion the removal of barriers to adoption of green building practices. This partnership will include provincial capital planners, the building industry, educators, and local governments, and will be chaired by recognized advocates for sustainable buildings.



ENERGY INTENSITIES IN COMMERCIAL BUILDINGS

Restaurants, hospitals, and supermarkets are some of the heavier energy users in the commercial sector. *Source: BC Hydro (1994)*

FORESTS AND AGRICULTURE

BC's forests and agricultural resources are potentially significant carbon sinks that can reduce our emissions of greenhouse gases. The size and nature of these sinks are largely unknown because of the complex biological processes involved.

The Kyoto Protocol recognizes a limited number of land use change and forestry practices as counting towards countries' commitments for the 2008-2012 period: reforestation, afforestation, and deforestation. International negotiations are continuing on how to define these activities and whether to include other forest management practices, as well as agricultural sinks.

Depending on the final international rules and quantification of provincial sinks, our forests and soils could count as either a net sink or a net source for greenhouse gases. This, in turn, could greatly affect the cost of meeting the Kyoto target for BC and Canada as a whole.

To manage these uncertainties, the province will improve understanding of the extent of forest and agricultural sinks, the implications of different Protocol rules, and the impacts of management practices. Whatever the outcome, BC will maintain its commitment to reducing emissions in all sectors of the economy.

Objective 1:
Learn more about the science and management of carbon sinks.

In the case of forestry, we must have a clear understanding of the position of BC's forests as a net sink or source under alternative international rules and definitions of the managed forest. For agriculture, more research is needed on the biochemical processes that produce GHGs and sequester carbon, such as soil composition and decomposition. Through a new funding initiative with the provinces, Agriculture and Agri-Food Canada intends to step up research on basic climate change science, as well as mitigation technologies.

Sink-related measurement, monitoring, reporting, and verification requirements have yet to be determined, but could prove costly and time-consuming to develop. BC is starting work now in these areas to scope the issues and identify where further effort is required.

Actions:

- **Forest carbon accounting framework.** The Ministry of Forests (MoF) is developing an accounting framework as a first step in exploring issues with respect to accounting and reporting requirements under the Protocol. This work will include investigation of a carbon information system and standards for carbon measuring, reporting, and monitoring in BC, with links to the national requirements.

- **Forest sink estimation.** With a national carbon emissions model developed by the Canadian Forest Service, MoF is doing carbon budget modelling to estimate the size of BC's above- and below-ground forest sink/source. The ministry will analyze emissions for the province's 14 biogeoclimatic regions under different combinations of potential accounting rules and reforestation definitions and various scenarios of fire, disease, and pest disturbance rates. Terms of Reference are now being written for detailed analysis using MoF regional assumptions for growth, disturbance, harvest rates, and other key variables. The work is expected to continue well into 2001.

- **Forest soil carbon estimation.** A large unknown, especially in coastal original-growth areas, is carbon storage in forest soils. Starting in 2001/02, MoF plans to design and develop a two-year field sampling program that would install a series of monitoring stations in the biogeoclimatic zones. The objective of the program would be to confirm or revise national-scale estimates of soil carbon.

- **Agricultural soil carbon sequestration.** The Ministry of Agriculture, Food and Fisheries (MAFF) is evaluating the potential for sequestration in agricultural soils, using detailed data on soils and cropping practices by agricultural area. This information will form the basis for an accounting policy in the event that agricultural sinks are included in the Protocol.

Objective 2:
Develop and encourage the use of management technologies and practices.

Forestry management practices are well established and include a number of activities not yet covered in the Kyoto Protocol, such as fertilization, pest and disease control, and thinning and spacing. Canada and the provinces have recognized afforestation (the establishment of new forests) as an effective measure for carbon sequestration; however, its broad application has yet to be tested.

BC also needs to develop the legislative framework to support sink management and trading in forest carbon, which could contribute to a future domestic trading system for greenhouse gases.

Actions:

- **Afforestation pilots.** Along with other governments and the private sector, BC will implement the first phase of a $6-million national program to afforest privately-owned land. Starting in 2001/02, the three-year planning and development phase will consist of regional pilots to test the mechanics of program implementation and measurement and monitoring systems, and to promote awareness and early action by industry. Details have yet to be finalized, but the work will likely be funded under federal/provincial cost-sharing agreements.

- **Legislation for carbon credits.** MoF will investigate required legislative changes to facilitate sequestration projects, forest carbon trading, and the development of non-timber rights to sequestration credits. Work will begin next year, with legislation to be drafted in 2002/03.

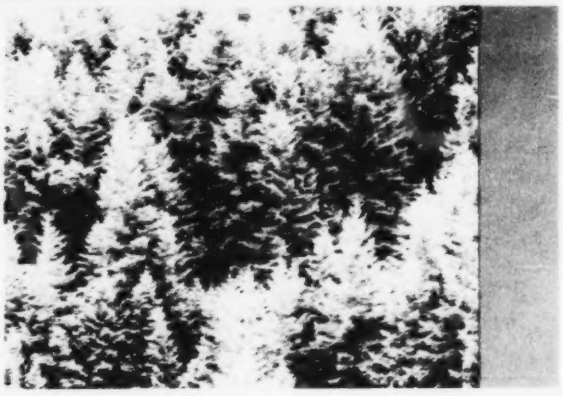
Objective 3:
Reduce GHG emissions from agricultural practices.

In agriculture, production changes take some time to adopt and their impacts will not be evident for a while. There are few sink management initiatives currently underway, although the federal government plans a number of best practices initiatives in soil, livestock, and fertilizer management, as well as research and development on biofuels. MAFF has identified reduced tillage and improved livestock management as promising measures for the reduction of methane and nitrous oxide emissions.

Action:

- **Agricultural workshops.** MAFF is preparing a series of workshops and discussion sessions to explain and investigate methods for reducing GHG emissions, in particular nitrous oxide and methane, through specific production practices. These workshops and local meetings with farmers will be held over the next two years, followed by the initiation of pilot project production systems in 2002/03.

FORESTS AND AGRICULTURE



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To manage these uncertainties, the province will improve understanding of the extent of forest and agricultural sinks, the implications of different Protocol rules, and the impacts of management practices. Whatever the outcome, BC will maintain its commitment to reducing emissions in all sectors of the economy.

FORESTS/AGRICULTURE SNAPSHOT

1. **The size and international treatment of BC biological sinks are currently uncertain.**
2. **Outcomes for sink estimation and international rules are critical for BC and Canada.**
3. **Risk management recommends continued research on sink science and management.**

Objective 1:

Learn more about the science and management of carbon sinks.

In the case of forestry, we must have a clear understanding of the position of BC's forests as a net sink or source under alternative international rules and definitions of the managed forest. For agriculture, more research is needed on the biochemical processes that produce GHGs and sequester carbon, such as soil composition and decomposition. Through a new funding initiative with the provinces, Agriculture and Agri-Food Canada intends to step up research on basic climate change science, as well as mitigation technologies.

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BC also needs to develop the legislative framework to support sink management and trading in forest carbon, which could contribute to a future domestic trading system for greenhouse gases.

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THE CARBON CYCLE AND SEQUESTRATION

There is a fixed amount of carbon in the earth's air, oceans, rocks, soils, vegetation, animal life, and fossil fuel reserves. Through photosynthesis, plants absorb or "sequester" carbon dioxide from the air and store it in the form of carbon, which is then released when the plants die and decay.

Soils and trees are among the natural reservoirs that sequester CO_2 and store carbon. Prior to the industrial revolution, the natural cycling process removed as much CO_2 as it added, so that the carbon cycle was roughly in balance.

Human activities, especially fossil fuel combustion and deforestation, are altering the carbon balance by returning more CO_2 to the atmosphere than natural processes can sequester.

Objective 3:

Reduce GHG emissions from agricultural practices.

In agriculture, production changes take some time to adopt, and their impacts will not be evident for a while. There are few sink management initiatives currently underway, although the federal government plans a number of best practices initiatives in soil, livestock, and fertilizer management, as well as research and development on biofuels. MAFF has identified reduced tillage and improved livestock management as promising measures for the reduction of methane and nitrous oxide emissions.

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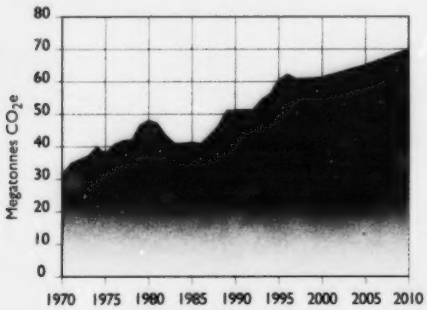
SUPPORTING ACTIONS

Cross-sectoral actions provide support for GHG management in the priority sectors identified above. Several of these actions are meant to begin encouraging emission reductions right away: public education and outreach, government leadership, and incentives for enhanced voluntary action. Support for climate change research and new technologies and the development of policy instruments are targeted at Phase Two of the national climate change strategy and future GHG reductions. All of these actions lay the groundwork for greater emission reductions in the future.

Economic instruments, such as emissions trading, may play a major role in future phases of the national strategy. BC favours a market-based approach to GHG reduction that ensures cost-effective emission reductions and continued competitiveness in world markets. A domestic emissions trading system, environmental taxes, and other potential measures for more aggressive reductions must be carefully considered and harmonized with the actions taken by our trading partners, particularly the US.



BC GHG EMISSIONS 1970–2010
Except during economic downturns, BC's emissions have grown steadily and will continue to do so unless stronger action is taken.
Source: AMG (1999)

Objective 1:
Motivate action through leadership and effective policies and programs.

Since the late 1970s, the province has reduced energy use in publicly funded buildings by more than 55 percent and saved over $120 million in energy costs. The government will now build on this effort with a commitment to reduce GHG emissions and a package of leadership activities designed to encourage action by individuals, businesses, and communities.

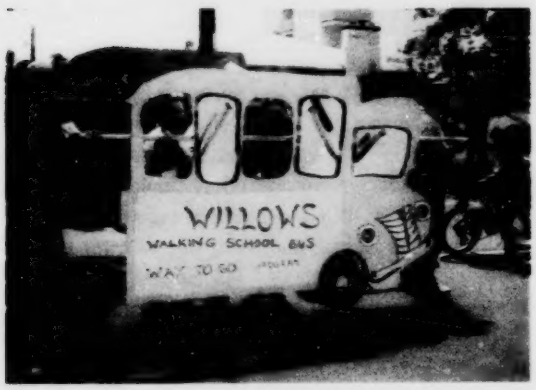
Canada is exploring the design of an emissions permit trading system and developing programs to protect and reward voluntary early actions on climate change. BC must evaluate domestic trading and other policy instruments and their potential impacts on the BC economy.

Actions:

- **Greening government.** The province will prepare an action plan to reduce GHG emissions and other environmental impacts from government operations. The plan, which will be submitted to VCR Inc. prior to the end of 2000, will include an emissions inventory and baseline forecast, a GHG reduction target, and specific actions in key areas, including:
  - **Vehicle fleets** – Government will set a target for reduced vehicle emissions. Actions could include the acquisition of more low-emission vehicles, switching from SUVs to cars, use of alternative fuels, and reduction in kilometres travelled.
  - **Buildings** – Targets will also be set for emission reductions from existing and new government buildings through the Green Buildings BC initiative.
  - **Green power** – The use of photovoltaics and other renewable energy sources will be increased in provincial parks. The province will also initiate discussions with BC Hydro and West Kootenay Power to acquire green power for selected government facilities on a pilot basis.
  - **Offset purchases** – Opportunities to invest in private sector GHG reduction projects as offsets for emissions from government operations will be assessed.
  - **Employee commuting** – The province will develop incentives and disincentives to reduce emissions from government employee travel and commuting.
  - **Green procurement** – Standards and policies for green procurement will be developed.

- **Market mechanisms**. Broad-based market approaches, such as emissions trading and environmental tax shifting, could be critical to achieving significant GHG reductions in future phases of BC's climate change strategy. The focus of this business plan is on continuing the province's leadership role in the development of market mechanisms through the following initiatives:

- **Tax shifting** – BC is a North American leader in environmental tax shifting, which is designed to shift the tax burden to polluters from environmentally sound businesses. The first tax-shift pilot was introduced in July 2000 to help phase out the province's remaining wood beehive burners. Stakeholders are being consulted on extending the tax shift initiative to encourage GHG reduction from vehicles, and possible new tax-shift pilots will be identified in areas such as buildings, oil and gas production, and land use.
- **Emissions trading** – Emissions trading, whether international or domestic, provides the critical flexibility for GHG reductions to take place where they are least costly. During the next three years, the province will develop, analyze, and consult on emissions trading system options and their implications for BC.
- **Emission reduction fund** – BC is prepared to work with other provinces and the federal government to develop a pilot fund to purchase GHG reductions. The intent of this fund would be to achieve real and incremental emission reductions and to test key elements of a market-based approach.
- **GERT Pilot** – Since June 1998, the Greenhouse Gas Emission Reduction Trading (GERT) Pilot has explored the mechanics of project-based emission trading and contributed to the development of national policy options for baseline protection, credit for early action, and domestic emissions trading. BC will continue to support the GERT Pilot's work in helping to define the role of project-based emissions trading in Canada.
- **Climate Partners** – The province will support this private sector initiative to encourage individuals, households, and businesses to invest in GHG emission reduction projects and offsets.



Objective 2:
Build knowledge and awareness.

BC has acquired research capability in climate change science, impacts, and adaptation through several organizations, including the University of Victoria's Centre for Climate Studies and the University of British Columbia-based Sustainable Development Research Institute. Despite these efforts, climate change knowledge is still in its infancy and much remains to be learned, particularly in the area of adaptation.

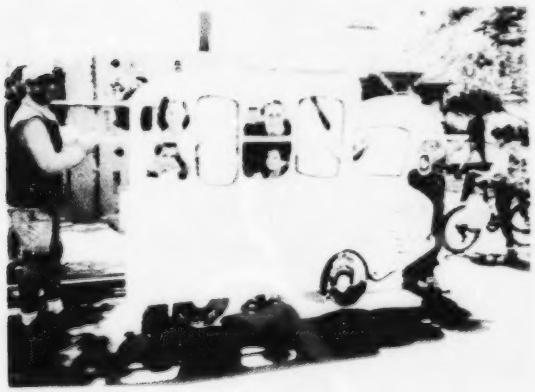
The role of public education and outreach (PEO) in motivating action is recognized in both the Kyoto Protocol and the national climate change strategy. BC and several other provinces are currently developing initiatives to address regional PEO needs.

Actions:

- **Adaptation in BC's fisheries sector.** MAFF is studying the impacts of climate change on species composition, abundance, and habitat, as well as stream fertilization and other mitigation measures. To offset losses in the salmon harvest, new fisheries are being developed (e.g., hake, mackerel, and squid) and a provincial policy has been released to facilitate aquaculture development. Gene banks have also been established for threatened species.

- **Science, impacts, and adaptation.** MELP will work to improve awareness among policy makers, resource managers, and stakeholders of climate change science, potential impacts in BC, and adaptation options. Initial projects would include the development of a set of climate change indicators, documentation of past trends of various provincial resources affected by climate change, and workshops on impacts and adaptation for key resource sectors. The ministry will also work with BC universities, the federal government, and industry to develop a BC-based organization to direct research and related activities on science, impacts, and adaptation. Initial tasks would include ensuring links to broader PEO initiatives, coordinating research and maintaining an inventory of impacts and adaptation research projects, and linking with the national network of regional hubs to guide research proposals.

- **Tax shifting** – BC is a North American leader in environmental tax shifting, which is designed to shift the tax burden to polluters from environmentally sound businesses. The first tax shift pilot was introduced in July 2000 to help phase out the province's remaining wood beehive burners. Stakeholders are being consulted on extending the tax shift initiative to encourage GHG reduction from vehicles, and possible new tax shift pilots will be identified in areas such as buildings, oil and gas production, and land use.
- **Emissions trading** – Emissions trading, whether international or domestic, provides the critical flexibility for GHG reductions to take place where they are least costly. During the next three years, the province will develop, analyze, and consult on emissions trading system options and their implications for BC.
- **Emission reduction fund** – BC is prepared to work with other provinces and the federal government to develop a pilot fund to purchase GHG reductions. The intent of this fund would be to achieve real and incremental emission reductions and to test key elements of a market-based approach.
- **GERT Pilot** – Since June 1998, the Greenhouse Gas Emission Reduction Trading (GERT) Pilot has explored the mechanics of project-based emission trading, and contributed to the development of national policy options for baseline protection, credit for early action, and domestic emissions trading. BC will continue to support the GERT Pilot's work in helping to define the role of project-based emissions trading in Canada.
- **Climate Partners** – The province will support this private sector initiative to encourage individuals, households, and businesses to invest in GHG emission reduction projects and offsets.



SUPPORTING ACTIONS SNAPSHOT

1. **Action should build the foundation for larger emission reductions in the future.**
2. **Voluntary initiatives and market-based policy instruments will be developed.**
3. **Education and awareness, leadership, and adaptation strategies are essential.**

Objective 2:
Build knowledge and awareness

BC has acquired research capability in climate change impacts and adaptation through several universities, including the University of Victoria's Centre for Global Studies and the University of British Columbia-based Sustainable Development Research Institute. Despite these efforts, climate change knowledge is still in its infancy and much remains to be learned, particularly in the area of adaptation.

The role of public education and outreach efforts in motivating action is recognized in both the Kyoto Protocol and the national climate change strategy. BC and other provinces are currently developing initiatives to meet regional PEO needs.

Actions:

- **Adaptation in BC's fisheries sector.** MELP is [illegible] the impacts of climate change on species composition, abundance, and habitat, as well as stream fertilization and other mitigation measures. To offset losses in [illegible] harvest, new fisheries are being developed for [illegible] mackerel, and squid) and a provincial policy [illegible] released to facilitate aquaculture development. [illegible] banks have also been established for [illegible]
- **Science, impacts, and adaptation.** MELP [illegible] improve awareness among policy makers, [illegible] managers, and stakeholders of climate change [illegible] potential impacts in BC, and adaptation options. [illegible] projects would include the development of [illegible] change indicators, documentation of [illegible] various provincial resources affected by climate [illegible] and workshops on impacts and adaptation [illegible] resource sectors. The ministry will also work [illegible] universities, the federal government, and [illegible] develop a BC-based organization to direct research-related activities on science, impacts, and [illegible]. Initial tasks would include ensuring links to [illegible] initiatives, coordinating research and [illegible] inventory of impacts and adaptation research, and linking with the national network of regional [illegible] guide research proposals.

- **Improved greenhouse gas inventories.** The province will work with the federal government, industry, and other emitters to improve existing GHG inventories. Provincial and federal policy makers need accurate information on BC's emissions in order to focus and design effective reduction strategies.

- **Public education and outreach initiative.** The province will establish a partnership with the federal and local governments, industry, and environmental groups to coordinate and facilitate climate change PEO activities over the next three years. Initial activities will include:
  - **Support for PEO partners** – MELP will continue to provide technical advice and support to federally funded projects, including the Canadian Climate Change Calculator, the BC Energy Aware Committee, BC Transit's Travel Options Program, and the Off Ramp Program operated by Better Environmentally Sound Transportation (B.E.S.T.).
  - **Knowledge Network TV series** – A television series and supporting videos will be completed in early 2001 on the topic of climate change science and BC-specific issues.
  - **School projects** – A support network will be created for social studies teachers using climate change as a teaching theme and identifying curriculum linkages, teaching resources, training opportunities, and action programs for schools.
  - **BC Clean Air Day** – The province will continue to work with its many partners on this annual June event to profile climate change issues and solutions.
  - **Public education materials** – The government's existing materials will be updated and new products will be developed on an as-needed basis through 2002/03.

Objective 3:
Develop, demonstrate, and commercialize low-emission technologies.

While some technologies for GHG reduction are sector-specific, others cut across sectoral boundaries – for example, hydrogen production, biotechnologies, and system integration. In September 1999, BC introduced a 10 percent tax credit for scientific research and experimental development, including R&D on greenhouse gas technology. The federal government has announced a Sustainable Development Technology Fund to develop and demonstrate new environmental technologies, with a focus on climate change and air quality.

Actions:

- **Green Economy Development Fund.** The province is providing $3 million in funding towards green technology demonstration projects that are between the R&D and commercialization stages.

- **Green Venture Capital Program.** This $1-million program helps small businesses raise money for developing and selling new environmental technologies and services. Investors in participating venture capital corporations will receive a 30 percent provincial tax credit and will be required to hold their investments for at least five years.

- **Fuel cell technology.** Fuel cells offer the potential for significant reductions in GHG and other emissions. BC has been a major supporter of fuel cell development and commercialization over the past two decades. The province and the federal government are now working with industry to implement a new BC-based initiative that will support fuel cell-related demonstration projects, the development of fuel cell clusters, and the wider application of fuel cell technology.

LOOKING AHEAD

BC is taking action on climate change. This business plan has described the actions that the province will take to reduce emissions and build momentum for the future.

The BC Climate Change Business Plan includes major new initiatives in transportation and technology, and is supported by more than $13 million in new funding for energy efficiency and renewable energy, community-based programs, education and outreach, policy development, and other initiatives.

BC's plan and those of other provinces, territories, and the federal government are instrumental to Phase One of Canada's response to climate change. During this phase – the period before the decision on an international treaty to limit emissions – Canadian governments are acting to cut emissions growth, develop new low-emissions technologies, build infrastructure, and prepare for the much more significant GHG reductions that would be required in later phases of the national strategy.

The BC business plan will be monitored and updated annually. Performance will be assessed using the preliminary indicators in Table 2, which will be refined over time and supplemented by targets. Each year, the indicator values, together with a review of progress, will be published on the MELP website (www.elp.gov.bc.ca/epd/epdpa/ar/climate). The provincial government will also work with public and private sector clients to identify new priorities and opportunities and develop further actions for inclusion in future business plans.

The province's climate change strategy and business plan will evolve over the coming years, in line with national and international developments. This is a long-term challenge, fundamentally linked to sustainability.

BC communities, businesses, organizations, and citizens all have a stake in our response to climate change, and all have important roles to play in curbing the growth in provincial greenhouse gas emissions.

The province values your feedback and input into the business planning process.

For comments and further information, please contact:

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LOOKING AHEAD

NEXT STEPS

1. **The plan's progress will be monitored, evaluated, and reported annually to the public.**
2. **Objectives, actions, and performance indicators will be updated yearly.**
3. **Public feedback and input on the business plan are welcome and important.**

BC is taking action on climate change. This business plan has described the actions that the province will take to reduce emissions and build momentum for the future.

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Table 2
PRELIMINARY PERFORMANCE INDICATORS

PRIORITY AREA	PERFORMANCE INDICATOR
TRANSPORTATION	Average fuel economy for existing and new vehicles
	Public transit ridership
	HOV lane usage
	Kilometres of cycling infrastructure
ENERGY AND INDUSTRY	Industrial GHG emissions per dollar of gross domestic product
	Percentage of new electricity demand met by renewable energy sources
	Volume of CO_2 sequestered in geological storage
COMMUNITIES AND BUILDINGS	Number of communities addressing energy issues in their local planning
	Volume of landfill gas recovered
	Updated energy efficiency standards and number of building retrofits
FORESTS AND AGRICULTURE	Investment in sink-related research and development
	Number of agricultural practices workshops and meetings
SUPPORTING ACTIONS	GHG emission reductions in government operations
	Public awareness of climate change
	Investment in low-emission technology

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Appendix I
CHRONOLOGY OF EVENTS

1972	United Nations Conference on the Human Environment identifies human-caused climate change as a serious global issue; UN Environment Program is established
1987	Montreal Protocol on the Elimination of Ozone-Depleting Substances is signed
1988	Toronto Conference on the Changing Atmosphere recommends a 20% reduction in global CO_2 emissions by 2005; Intergovernmental Panel on Climate Change created
1990	IPCC releases First Assessment Report calling for global action on climate change; international negotiations begin towards an agreement
1992	UN Framework Convention on Climate Change (UNFCCC) is negotiated at the Rio de Janeiro Earth Summit, calling for stabilization of atmospheric GHGs "at a level that would prevent dangerous anthropogenic interference with the climate system"; 155 countries have ratified the UNFCCC
1995	Berlin Mandate is adopted at CoP1 to negotiate post-2000 emission reduction commitments; *BC Greenhouse Gas Action Plan* released; Canada's National Action Program on Climate Change is endorsed by Energy and Environment Ministers; IPCC Second Assessment Report finds evidence of "a discernible human influence on global climate" and a 0.3-0.6°C average global temperature increase over the past century
1997	BC Greenhouse Gas Forum is created; Kyoto Protocol is negotiated at CoP3, with developed countries committing to reduce their overall emissions of six GHGs by at least 5% below 1990 levels in 2008-12; Kyoto Mechanisms are established to ensure flexibility for meeting commitments; Canadian Energy and Environment Ministers are directed to create a national process to examine the impact, costs, and benefits of implementing the Protocol and Canada's implementation options
1998	National climate change process initiated; Issue Tables and working groups are formed from 450 experts to assess Canadian options and impacts; Buenos Aires Plan of Action (BAPA) is adopted at CoP4 to strengthen implementation of the FCCC and to prepare for the Protocol's entry into force
1999	Work continues on implem[illegible]ing BAPA at CoP5 in Bonn; first Options Reports from the Issue Tables are released
2000	Energy and Environment Ministers agree on the key elements of the national implementation strategy and *Frst National Climate Change Business Plan*; national stakeholder sessions are held in the provinces; final Issue Table Reports released; BC and other jurisdictions draft business plans; draft national implementation strategy is developed; CoP6 in The Hague focuses on Kyoto Mechanisms, carbon sinks, developing countries, and compliance
2001	IPCC Third Assessment Report is scheduled for release; focus will be on scientific findings since 1995 and regional impacts of climate change

POTENTIAL FUTURE EVENTS

2002	Possible decision on ratification of the Kyoto Protocol or other international agreement; possible decision on major domestic policy instruments and to allocate responsibility for emissions reduction target
2005	Canada and other developed countries must demonstrate progress on their Kyoto commitments
2008–12	First commitment period of the Kyoto Protocol; domestic strategy is implemented
2012+	Future agreements and emission reduction commitments

Appendix 2

ADDITIONAL BC ACTIONS: INITIATED PRIOR TO THIS FISCAL YEAR

ACTION/LEAD	DESCRIPTION
TRANSPORTATION	
Motor fuel tax exemptions for alternative fuels (MFCR)	Provincial fuel tax exemption for natural gas and 85% ethanol and methanol blended fuels; preferential tax rate for auto-propane of 7% of price; tax exemption for ethanol in lower-level gasoline-ethanol blends once a commercial-scale ethanol plant is operating in BC
Partial sales tax rebate for factory-produced AFV and vehicle conversions (MFCR)	Tax refund of up to $500 for purchases of eligible new factory-manufactured AFV and up to $5,000 for eligible alternative fuel passenger buses; kits and installation labour to convert existing motor vehicles to operate on alternative fuels are also exempted
Gasoline and diesel tax for public transit (MFCR)	Provincial tax collected on behalf of certain public transit authorities (4 cents per litre in the GVRD and 2.5 cents per litre in Greater Victoria)
AirCare program (TransLink/ICBC)	Emissions inspection and maintenance program for light-duty vehicles in Greater Vancouver and the Fraser Valley; recent changes include on-road testing of heavy-duty trucks, new equipment and test procedures for light-duty vehicles, and an enhanced inspection for new (1992 and newer) vehicles starting in January 2001
ENERGY AND INDUSTRY	
Tax exemption for energy conservation materials and equipment (MFCR)	Provincial sales tax exemption for certain energy conservation materials and equipment, including building insulation and certain wind, solar, and micro-hydro equipment
PowerSmart (BCH)	BC Hydro program started in 1989 to encourage customer energy efficiency in homes, businesses, industrial facilities, and communities
Ozone depleting substances legislation (MELP)	Amended in 1999, the BC Ozone Depleting Substances and other Halocarbons Regulation establishes stricter controls of ODS and includes controls on halocarbons
COMMUNITIES AND BUILDINGS	
Partners for Climate Protection (FCM)	FCM program involving 20 BC municipalities; includes software tools, technical manuals, training workshops, monitoring and verification, reporting protocols, and development and promotion of local action plans
Energy Aware Committee (EAC)	BC committee working with interested local governments to promote and support community energy planning (CEP); has conducted CEP workshops for governments in the GVRD, Central Okanagan, Capital Regional District, and City of Abbotsford
GVRD Regional and Local Government Working Group on Climate Change (GVRD)	Working group formed in 1997 to share information and expertise on climate change and build capacity for implementing actions; activities have included a CEP workshop jointly sponsored with the EAC, a survey of local government GHG management actions and opportunities, and identification of local actions, such as retrofits of municipal recreational pools with solar thermal water heating technology
Air 2000 Program (GVRD)	Program launched in September 1999 to initiate early actions to reduce emissions of priority pollutants affecting both regional air quality and climate change; ongoing projects include workshops to encourage individual action, residential surveys of attitudes and practices, demonstrations of high-volume flyash concrete, partnerships for residential and commercial building retrofits, retrofits of municipal pools with solar thermal water heating, and a local government GHG action guide
Urban areas – assessment of options for reducing GHGs in the GVRD (GVRD/MELP)	Study underway to estimate GHG reductions and costs, reductions of other air contaminants, and ancillary benefits, including improvements to air quality and public health; work has future extensions to assessments for the Lower Fraser Valley and other urban regions
SUPPORTING ACTIONS	
Assistant Deputy Ministers (ADMs) Climate Change Committee	Committee of ADMs from all provincial agencies affected by climate change impacts and actions; coordinates related BC government policy development and program initiatives
British Columbia Greenhouse Gas Forum (MELP/MEM)	Representatives of local government, industry, business, labour, environmental groups, and other interests; advises the ministers of Environment, Lands and Parks and Energy and Mines on climate change policy and facilitates the development and implementation of GHG reduction actions
Environmental Youth Team (MELP)	Financial contributions to various agencies for hiring youth to participate in environmental protection and education initiatives, including climate change
BC scientific research and experimental development tax credit (MFCR)	10% tax credit implemented in 1999 for eligible research and development, including GHG-related technology

Appendix 3

MAPPING TO NATIONAL BUSINESS PLAN

NATIONAL THEME	BC BUSINESS PLAN ACTION
Enhancing Awareness and Understanding	Transportation awareness collaborative Public education and outreach initiative
Promoting Technology Development and Innovation	Fuel cell vehicles and technology Fuel ethanol production National biomass ethanol development centre Office of Green Buildings Technologies Green Buildings Partnership Green Economy Development Fund Green Venture Capital Fund
Governments Leading by Example/ Governments House in Order	MoTH lease of alternative fuel vehicles Greening government
Investing in Knowledge/Building the Foundation	Forest carbon accounting framework Forest sink estimation Forest soil carbon estimation Agricultural soil carbon sequestration Market mechanisms Adaptation in BC's fisheries sector Science, impacts, and adaptation Improved GHG inventories
SECTORAL ACTIONS	
Agriculture	Agricultural workshops
Buildings	Green Buildings BC Retrofit Program Green Buildings BC New Buildings Program Appliance and equipment energy standards
Electricity	BC Hydro Offset Program Request for green power Energy Futures Program Water rental incentives for small hydro Renewable energy initiative
Forestry (sinks)	Afforestation pilots Legislation for carbon credits
Industry	Industry energy efficiency audits and incentives Beehive burner tax shift pilot
Oil and gas	Oil and Gas Environmental Fund Energy carbon management strategy
Municipalities	Greening communities Landfill gas management Urban and rural local government infrastructure Regional growth strategies and TDM
Transportation	SkyTrain expansion HOV and transit lanes Financial and legislative support for cycling Consultations on light-duty vehicle emissions options Long-term tax policy for alternative fuels Natural gas hybrid ferry Proposed passenger rail service expansion Selected ITS measures Federal action on transit, technology, and vehicle fuel efficiency

GLOSSARY

Acid gas injection. The injection of hydrogen sulphide, carbon dioxide, and other impurities removed from natural gas into an underground formation for disposal or sequestration purposes.

Adaptation. Climate change action that responds to the impacts of climate change, rather than attempting to prevent them (mitigation); e.g., the construction of dykes for flooding or switching to different agricultural crops.

Afforestation. The planting of new forests on land that has historically not been forested.

Baseline protection. A policy commitment by government intended to ensure that emitters are not disadvantaged by taking early actions to reduce emissions.

Beehive burner. An incinerator for wood residue.

Biofuel. Wood residue, alcohol fuels, and other organic materials, burned to generate energy.

Biogeoclimatic zone. A large geographic area with a broadly homogeneous macroclimate having characteristic plant associations and soil-forming processes.

Biomass energy. Energy produced by combusting biomass materials, such as wood residue.

Carbon budget. The balance of the carbon exchanges (incomes and losses) between sinks in the carbon cycle.

Carbon dioxide. A colourless, odorless, non-poisonous gas that occurs naturally in the atmosphere; sources include fossil fuel combustion, deforestation, and natural biomass decay.

Carbon dioxide equivalent. A metric measure used to compare the emissions from various GHGs based on their global warming potential (GWP); computed by multiplying the tonnes of the gas (e.g., methane) by the associated GWP (e.g., 21 for methane).

Carbon sequestration. The absorption and storage of carbon; e.g., trees absorb CO_2, release the oxygen, and store carbon.

Carbon sink. Carbon reservoirs and conditions (e.g., forests and oceans) that absorb and store more carbon (carbon sequestration) than they release.

Clean Development Mechanism. A mechanism under the Kyoto Protocol whereby developed countries can finance GHG reduction projects in developing countries and receive credit for the reductions against their own emission reduction targets.

Coalbed methane. Methane produced from coalbeds just as natural gas is produced from other strata.

Cogeneration. The production of two useful forms of energy, such as high-temperature heat and electricity, from the same process; can result in a 40 to 80 percent increase in efficiency.

Credit for early action. A program that provides credits against potential future obligations as an incentive for early emission reductions.

Deforestation. The conversion of forest to non-forest, which is not immediately followed by the establishment of the same forest type on the same site.

District energy. A heating and/or cooling system in which steam or hot water for space heating or hot water is piped from a central boiler plant or cogeneration plant to a cluster of buildings.

Emission offset. A voluntary or mandated reduction in emissions from one or more sources that is used to mitigate increases in emissions from another source.

Emissions trading. A regulatory program that allows firms the flexibility to choose between reducing their own emissions and securing emission reductions from another source.

Ethanol. An alcohol produced from corn, grains, grasses, wood residue, or other biomass that can be blended with gasoline as a vehicle fuel.

Feebate. A revenue-neutral fiscal measure that increases taxes on some products and uses the revenues to provide incentives or rebates to other products.

Fine particulates. Tiny solid and liquid particles, such as dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by combustion and other sources, or formed by atmospheric reactions between pollutant gases.

Flaring. Burning in flares of natural gas or landfill gas for safety or other reasons.

Fuel cell. An electrochemical device that works like a battery, converting chemical energy directly into electricity.

Fugitive emissions. Unintentional leaks of natural gas during the processing, transmission, and/or transportation of fossil fuels.

Global warming potential. An index used to compare the relative radiative forcing of different gases without directly calculating the changes in atmospheric concentrations; given by the ratio of the radiative forcing that would result from the emission of one kilogram of a GHG to one kilogram of CO_2 over a fixed period of time, such as 100 years.

Halocarbons. Carbon-based compounds that may contain hydrogen, fluorine, chlorine, and other elements in their structure; include ozone depleting substances and hydrofluorcarbons which contribute to global warming.

Intelligent transportation system. Any project that applies electronics, communications, or information processing technology to improve the safety or efficiency of a surface transportation system.

Joint Implementation. Mechanism under the Kyoto Protocol whereby a developed country can receive "emissions reduction units" when it helps finance GHG reduction project in another developed country (including countries with economies in transition).

Landfill gas recovery. The collection of landfill gas through a series of wells and piping systems installed at a landfill for the purpose of combustion by flaring or energy utilization.

Reduced tillage. Technologies for minimum and zero tillage in agriculture to reduce soil erosion, improve water conservation, and reduce farm machinery costs; e.g., non-inversion technologies keep productive amounts of residue mulch on the surface.

Methane. A hydrocarbon gas that is the main constituent of natural gas; sources include natural gas processing, livestock, rice paddies, wetlands, biomass burning, and landfills.

Methanol. A light alcohol that can be blended with gasoline as a vehicle fuel.

Nitrous oxide. A colourless gas occurring naturally in the atmosphere; sources include motor vehicles, chemical and industrial operations, other fossil fuel combustion, and natural vegetative processes.

Perfluorocarbon. A group of chemicals and potent GHGs produced in aluminum smelting and semiconductor manufacturing.

Photovoltaics. The use of solid-state semiconductor devices (solar cells) to convert the radiant energy of sunlight directly into electrical energy.

Pollution prevention planning. A planning process to ensure that pollution is avoided, eliminated, and reduced at the source rather than being treated or contained once it already exists.

Radiative forcing. A change in average net radiation in the upper atmosphere due to a change in incoming solar or exiting infrared radiation; GHGs produce positive radiative forcing, warming the earth's surface.

Smog precursors. Chemical constituents such as volatile organic compounds and nitrogen oxide that react in the presence of sunlight to create photochemical smog.

Reforestation. Replanting of forests on lands that have previously been harvested.

Transportation demand management. Various measures to manage the number, length, and type (e.g., transit versus single-occupancy vehicle) of vehicle or passenger trips.

PHOTO ACKNOWLEDGEMENTS

Cover
Drawing of alternative energy home by student at Campus View Elementary School, Victoria.
Courtesy of Ministry of Environment, Lands and Parks.

Cover and page 5
Surrey Central Station linking SkyTrain with bus network.
Courtesy of BC Transit.

Cover and page 8
Flame from natural gas stove.
Courtesy of Energy Aware Committee.

Page 9
Island Cogeneration Plant (ICP) near Campbell River produces electricity for BC Hydro and steam for paper mill at Elk Falls.
Courtesy of ICP.

Page 10
BC Hydro employee at wind monitoring tower in Alert Bay.
Courtesy of BC Hydro.

Cover and page 11
Vancouver Telus Building before and after retrofit with high-tech skin and operable windows.
Courtesy of BC Buildings Corporation.

Page 12
BC Institute of Technology (BCIT) building with photovoltaic panels integrated into structure.
Courtesy of BCIT.

Cover and Page 14
Saanich Inlet forest, Vancouver Island.
Stock photography.

Page 15
Tree planter at work.
Courtesy of Ministry of Forests.

Cover and page 16
Two student participants in B.E.S.T. Off Ramp trip reduction program that encourages use of alternative transportation to school.
Courtesy of Better Environmentally Sound Transportation.

Page 17
Students and parents involved in Way to Go! program operated by the Insurance Corporation of BC and Autoplan Brokers RoadSense Team enjoy their walk to school.
Courtesy of Way to Go!

Page 18
Ballard fuel cell-powered bus operated by TransLink.
Courtesy of Ballard Power Systems.

Cover and page 19
Children take a ride on a double-decker bus.
Courtesy of MELP.